

# **Performance Tuning and Optimizing Microsoft SQL Databases (MS-10987) (Flex)**

**Modality: Virtual Classroom**

**Duration: 16 Days (2 hrs/day)**

## **About this course:**

Performance Tuning and Optimizing Microsoft SQL Databases is a role that solely a professional database administrator can manage. Although, if you are a person who is already in the game and needs to upgrade your knowledge and skills of Microsoft SQL Server Databases, then this course is definitely for you!

This extraordinary IT Ops preparing program is intended to provide you a broad knowledge and expertise to manage, optimize, and maintain SQL Databases.

## **Course Objectives:**

After successful completion of this course, candidates can:

- Explain the SQL Server execution queues, waits, and model.
- Explain architectural best practices and concepts associated with data files for TempDB and user databases.
- Explain the architectural theory of the Optimizer and ways to detect and diagnose query plan problems.
- Explain architectural best practices, ideas, and troubleshooting scenarios associated with Plan Cache.
- Explain the high-level architectural summary of SQL Server and its different parts.
- Describe data collection techniques and strategy to examine gathered data.
- Explain performance testing, Storage Area Networks and main I/O concepts.
- Explain architectural usage scenarios, concepts, and troubleshooting strategy for Extended Events.
- Explain architectural practices and concepts associated with Transactions, Concurrency Locking, and Isolation Levels.
- Learn methods to detect and fix bottlenecks to streamline overall performance.

## Audience:

If you work as a role of Microsoft SQL Server database administrator or manager, then this course is definitely for you. You may appear on this course and take benefit from it enormously in case you are seeking to discover how to improve SQL databases with ease. You can also appear in the course if you need to provide better performance of the workloads and draft successful data queries.

This learning program is further focused on application engineers who provide content from SQL Server databases.

## Prerequisites:

The candidates who are appearing in this exam must have the following technical knowledge and experience:

- Practical understating of database maintenance and administration.
- Practical understanding of Transact-SQL.
- Fundamental knowledge of the Microsoft Windows OS and its main functions.

## Recommended prerequisites courses:

- MS-20761 (Querying Data with Microsoft Transact-SQL)
- Oracle Database 12c Fundamental

## Course Outline:

### Module 1: SQL Server Architecture, Scheduling, and Waits

This module covers high level architectural overview of SQL Server and its various components. It dives deep into SQL Server execution model, waits and queues.

#### Lessons

- SQL Server Components and SQL OS
- Windows Scheduling vs SQL Scheduling
- Waits and Queues

### Lab : SQL Server Architecture, Scheduling, and Waits

After completing this module, you will be able to:

- Describe the SQL Server components and SQL OS

- Describe the differences between Windows Scheduling and SQL scheduling
- Describe waits and queues

## Module 2: SQL Server I/O

This module covers core I/O concepts, Storage Area Networks and performance testing. It focuses on SQL Server I/O operations and how to test storage performance.

### Lessons

- Core Concepts
- Storage Solutions
- I/O Setup and Testing

### Lab : Testing Storage Performance

After completing this module, you will be able to:

- Describe the core concepts of SQL I/O
- Describe storage solutions
- Setup and test I/O

## Module 3: Database Structures

This module covers Database Structures, Data File and TempDB Internals. It focuses on architectural concepts and best practices related to data files for user databases and TempDB.

### Lessons

- Database Structure Internals
- Data File Internals
- TempDB Internals

### Lab : Database Structures

After completing this module, you will be able to:

- Describe the internal setup of database structures
- Describe the internal setup of data files.
- Describe the internal setup of TempDB

## Module 4: SQL Server Memory

This module covers Windows and SQL Server Memory internals. It focuses on architectural concepts and best practices related to SQL Server Memory Configuration.

### Lessons

- Windows Memory
- SQL Server Memory
- In-Memory OLTP

### Lab : SQL Server Memory

After completing this module, you will be able to:

- Describe the components of Windows memory
- Describe the components of SQL Server memory
- Describe In-Memory OLTP

## Module 5: SQL Server Concurrency

This module covers Transactions and Locking Internals. It focuses on architectural concepts and best practices related to Concurrency, Transactions, Isolation Levels and Locking.

### Lessons

- Concurrency and Transactions
- Locking Internals

### Lab : SQL Server Concurrency

After completing this module, you will be able to:

- Explain concurrency and transactions
- Describe locking

## Module 6: Statistics and Index Internals

This module covers Statistics and Index Internals. It focuses on architectural concepts and best practices related to Statistics and Indexes.

### Lessons

- Statistics Internals and Cardinality Estimation
- Index Internals
- Columnstore Indexes

### **Lab : Statistics and index Internals**

After completing this module, you will be able to:

- Describe statistics internals
- Explain cardinality estimation
- Describe why you would use Columnstore indexes and be able to implement one

## **Module 7: Query Execution and Query Plan Analysis**

This module covers Query Execution and Query Plan Analysis. It focuses on architectural concepts of the Optimizer and how to identify and fix query plan issues.

### **Lessons**

- Query execution and optimizer internals
- Query execution plans
- Analyzing query execution plans

### **Lab : Query execution and query plan analysis**

After completing this module, you will be able to:

- Describe query execution and optimizer
- Analyze query plans and resolve common issues

## **Module 8: Plan Caching and Recompilation**

This module covers Plan Caching and Recompilation. It focuses on architectural concepts, troubleshooting scenarios and best practices related to Plan Cache.

### **Lessons**

- Plan cache internals
- Troubleshooting plan cache issues
- Query store

### **Lab : Plan caching and recompilation**

After completing this module, you will be able to:

- Describe plan cache
- Troubleshoot plan cache issues
- Describe query store and why you would use it

## **Module 9: Extended Events**

This module covers Extended Events. It focuses on architectural concepts, troubleshooting strategy and usage scenarios for Extended Events.

### **Lessons**

- Extended events core concepts
- Working with extended events

### **Lab : Extended events**

After completing this module, you will be able to:

- Describe the core concepts of extended events
- Implement extended events

## **Module 10: Monitoring, Tracing, and Baselineing**

This module covers tools and techniques to monitor, trace and baseline SQL Server performance data. It focuses on data collection strategy and techniques to analyze collected data.

### **Lessons**

- Monitoring and tracing
- Baselineing and benchmarking

### **Lab : Monitoring, Tracing and Baselineing**

After completing this module, you will be able to:

- Describe various options for monitoring and tracing
- Describe various options for benchmarking and baselineing